(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
7 December 2000 (07.12.2000)

PCT

(10) International Publication Number
WO 00/74017 A1

(51) International Patent Classification[7]: G08B 13/14, 21/00

(21) International Application Number: PCT/IT99/00280

(22) International Filing Date:
3 September 1999 (03.09.1999)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
MI99A001169 27 May 1999 (27.05.1999) IT

(71) Applicants *(for all designated States except US)*: **BUONAVOGLIA, Fiorina, Rita** [IT/IT]; Via Santuario 40, I-24040 Stezzano (IT). **BUONAVOGLIA, Nicolina** [IT/IT]; Via Santuario 40, I-24040 Stezzano (IT).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **BUONAVOGLIA, Girolamo** [—/IT]; Via Santuario 40, I-24040 Stezzano (IT).

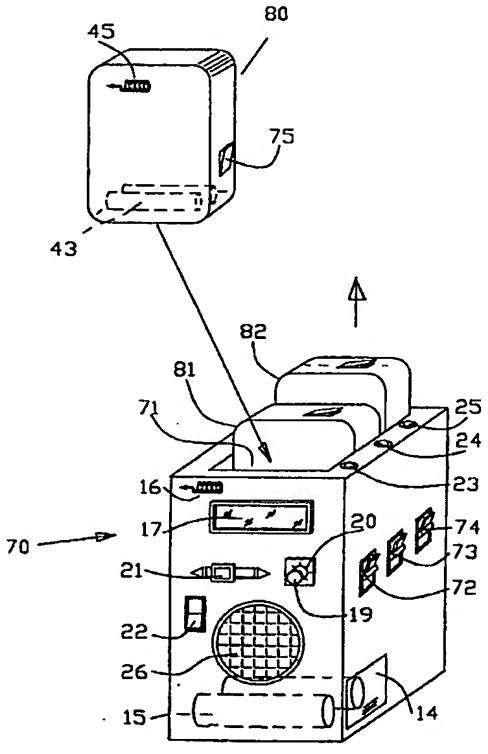
(74) Agent: **DIGIOVANNI, Italo**; Brevetti Dott. Ing. Digiovanni Schmiedt S.r.L., Via Aldrovandi, 7, I-20129 Milano (IT).

(81) Designated States *(national)*: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: PROCESS AND ELECTRONIC DEVICE FOR DEDICATED VOICE TELECONNECTION, BY ELECTROMAGNETIC WAVES BETWEEN THE USER AND MOVING PERSONS, ANIMALS, OR OBJECTS



(57) Abstract: Process and electronic device (70, 80) miniaturized, pocket-sized, with independent electric feed (15) for teleconnection by means of electromagnetic waves between a receiver device (70) for the user and one or more transmitters (80-82) for persons, or for association to animals or objects, entities in general, under the care of the user, comprising a dedicated voice electronic circuit which, as soon as the distance between one of the transmitters (80) and the receiver (70) reaches a set value, produces in the receiver (70) an acoustic warning generated by calling out a name or some word that identifies the protected entity.

WO 00/74017 A1

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

5

10

PROCESS AND ELECTRONIC DEVICE FOR DEDICATED VOICE TELECONNECTION,BY ELECTROMAGNETIC WAVES BETWEEN THE USER AND MOVING PERSONS,ANIMALS,OR OBJECTS

The inventioin concerns electronic alarm and safety devices for protecting persons, animals and objects, mobile entities in general.

The ease with which children or elderly people can be lost on roads, in gardens and public places generally, or objects be stolen or mislaid, especially wallets, bags, keys, mobile phones, is a well known problem.

The increasing speed at which social relations are maintained, partly due to technical progress and greater wellbeing, means that present forms of electronic protection or simply keeping a check on one or more persons, animals or objects, are inadequate and may even create problems of interference, superimposition, interruption of signals, and so on.

It is therefore no easy matter for one person, standing still, to look after a number of people, animals or objects, risking even serious trouble in doing so.

Purpose of the present invention is to provide a compact and inexpensive device comprising a receiver and transmitters able not only to cope with or reduce such trouble by keeping steady contact,

devoid of interference, between the user and a number of people, animals or objects in his keeping but also to facilitate finding and recognising them, especially if any danger arises.

Subject of the invention is a process and a miniaturized pocket-size device, with independent electric feed for teleconnection by electro-magnetic waves between a receiver device for the user and one or more transmitters for the persons, animals or object, or entities generally, in that user's keeping.. As soon as the distance between one or another of the transmitters and the receiver reaches a certain value, an electronic circuit emits an acoustic warning to the receiver enabling the user to take action to protect the entity to which the transmitter has been connected and that has emitted the warning.

The electronic circuit is "voice dedicated" so that the acoustic warning is generated by calling out a name that identifies the protected entity.

Receiver and transmitter battery consumption is reduced by receiver-transmitter connection by means of codified discontinuous transmission.

When physical separation takes place between each transmitter and the receiver, special devices and circuits automatically activate the separated receiver and transmitter, deactivate the transmitter and, on reactivation of all transmitters, deactivate the receiver.

The devices for automatic activation and de-activation are micro-switches physically switched on by activation or de-activation of the transmitters in relation to the receiver.

The microswitches are preferably magnetic.

In one type of execution the transmitters comprise a circuit that sets off a warning signal in the receiver if any vocal emission is given, such as a child crying or a person voicing a complaint.

Another circuit compares the distance, from one moment to the

next, between transmitters and the receiver, with an electronic threshold of value which the user modifies by a regulating device.

When this threshold is exceeded, one or more alarm or operative devices immediately come into action.

A manual two-position selector on the receiver, causes the alarm device to take effect due to variations in distance, whether increased or reduced, these being useful when the protected entity goes beyond the safety distance, or to assist in finding a lost entity, especially an object, such as spectacles, an umbrella, a wallet, mobile phone and the like.

If the electronic threshold is exceeded, a special means of control on the receiver can activate operative functions useful, for example, when the entity in possession of a transmitter goes away from a place where the receiver is installed, functions such as switching on a car theft alarm, or one for some premises, closing a gate and a door, turning off lights or a heating system, or for the reverse operations when the user returns to the same place.

The invention offers evident advantages.

Being so highly versatile it can serve a wide variety of purposes.

The user with the receiver placed in an inside pocket, connected in some manner or in any case kept close, can immediately know if any person or any object to whom, or to which, a transmitter has been associated has moved, or been moved, from the distance set on the receiver.

For example, the user can at once know if a thief has taken his wallet in some crowded place, if he has forgotten to pick up his umbrella or to keep watch over some piece of baggage.

The following concrete examples of possible applications indicate further advantages.

On entering a café, a person puts his umbrella, fitted with a transmitter according to this invention, in an umbrella stand. When

ready to leave he forgets the umbrella. Having walked some distance, longer or shorter according to how the device has been set, the receiver in his pocket emits a warning sound.

A parent does not want his child, playing outdoors, to get more than say 50 yards away so he attaches a transmitter to the child's clothing and sets this distance by turning the knob on the potentiometer in the device. If the child goes beyond this distance, the parent is warned by an acoustic signal.

A thief enters an apartment during the night; a transmitter, as here invented, has been mounted on the entry door after using the device to make an accurate measurement of the distance between the door and the person's bed. When the thief opens the door this brings the transmitter closer to the receiver placed, for example, on the bedside table, from where it sets off an alarm.

A shortsighted person does not remember where he has put down his spectacles or the television remote control device to which transmitters, as here invented, have been applied, or else he wants to find where his cat, that is wearing one of these transmitters, has hidden himself. He therefore sets a low value (e.g. 50-100 cm) on the receiver and goes round the house until a warning sound is given telling him that his spectacles, or whatever else may be lost, are nearby.

In particularly difficult situations, such as under snow, in fog or under water, helpers receive decisive assistance by using the devices here described.

Alarm signals can also be automatically activated in motor vehicles, at places of work or in the home, for closing gates and doors, for turning off lights or heating systems, as well as for other useful functions when a user leaves such places to go somewhere else.

Even without any specific action on the part of the user, these functions ensure protection in cases of forgetfulness or incapacity.

When the user returns to his car or to the place previously left, alarms can be automatically de-activated and gates and doors be opened.

Of exceptional importance is the warning signal obtained by calling out the name or the word identifying the protected entity. The user in possession of the receiver can immediately know, on hearing the alarm, which protected entity, person, animal or object, has gone outside the safety distance and research be made easier.

With the electronic complex described above, the chances of people or objects becoming lost or mislaid are greatly lessened, activation and de-activation of alarm systems facilitated, as well as opening and closing of gates and doors, structural and electronic forms of protection, all this contributing to increase user comfort.

Structural simplicity is an important feature of the electronic complex described, added to its being inexpensive to produce and highly practical to use, further features favouring universal diffusion.

Characteristics and purposes of the disclosure will be made still clearer by the following examples of its execution illustrated by diagrammatically drawn figures.

Figure 1 Perspective of the receiver of this apparatus with space for three transmitters.

Figure 2 Perspective of a receiver with space for one transmitter.

Figure 3 Another version of the receiver and transmitter with automatic activation, perspective.

Figure 4 Electronic diagram of the receiver.

Figure 5 Electronic diagram of a transmitter.

In the radiofrequency receiver 10, shaped like a small parallelepiped box, is a compartment 11, open at the top, to take three flat box-shaped radiofrequency transmitters 40-42.

One transmitter 40 is shown as having been taken from the compartment 11 while the transmitter 40 is being taken out.

In the space 14 inside said receiver 10 is a battery 15 for independent electric feed, the receiver also comprising a microswitch 13 for connection to said feed and for activating it, an antenna 16, a display 17, a potentiometer 19 with rotating shaft and graded scale 20, a two-position sliding selector 21, a press switch 22, a set of LEDs 23-25 that, by lighting up, show activation of the various transmitters 40-42, and a loudspeaker 26.

The receiver's electronic circuits (Figure 4) comprise a high-frequency and radiofrequency amplifier and stage separator circuit 30, a decoding circuit 31 for personalizing the transmitted signal, a comparator circuit 32, threshold indicator for distance and logic stage driver, a transmitted signal timer circuit 33, a buzzer amplifier circuit 34, a decoding circuit 35 and indicator of the emitting transmitters, a display 17.

The transmitter 40 comprises a battery 43 for electric feed, an antenna 45, a microswitch 46 for connection to electric feed and for activating it

The transmitter's electronic circuits (Figure 5) comprise a transmitted signal timer circuit 50, a decoding circuit 51 for personalizing the transmitted signal, a radiofrequency stage amplifier circuit 52.

If out of use the transmitters 40-42 remain inside the compartment 11 in the receiver 10.

When the user needs the device, he takes out the transmitters 40-42 and attaches one or all respectively to the entities to be supervised. For example, he uses some adeeuate means for attaching a transmitter to a child or to an animal or even to some object to be protected against loss such as a travelling bag, an umbrella, a mobile phone or a wallet.

Different codes are put into the transmitters.

The receiver is tuned to the same frequency as that of the transmitters and is programmed to recognise their codes only.

After activating the two components, transmitters and receiver, by means of the microswitches, respectively 13 and 46, radiofrequency signals are broadcast with the codes put into them.

The transmitters broadcast by means of codified discontinuous transmission, thus considerably reducing battery consumption.

The signals broadcast are continually compared in the receiver through the comparator circuit 32 comprising an electronic threshold that the user sets with the potentiometer 19.

This threshold corresponds to a certain distance between the transmitter and the receiver.

Once this threshold is exceeded, the alarm signal is given in the receiver due to the difference in distance between transmitter and receiver, which may be increased or lessened according to one of the two positions assumed by the slider selector 21.

The first case is useful for immediately knowing when a person, animal or object moves or is taken away beyond the pre-set safety distance, while utility in the second case is seen when looking for an object put down absentmindedly and forgotten, such as a person's spectacles, umbrella, wallet, mobile phone, and so on.

By pressing the switch 22 on the receiver, if the electronic threshold has been exceeded, operative functions such as those described can be brought into action.

A warning is given both visually and acoustically upon which the distinctive name for the object is called out and broadcast.

In this way the user having with him the receiver can know, on receiving the alarm, which protected entity, person, animal or object is beyond the safety distance, and can take the necessary steps for retrieval of the entity concerned.

High frequency operation and possibility of mounting SMD circuits mean that both transmitters and the receiver can be miniaturized greatly reducing bulk and making it possible to fit the transmitters,

at the time of manufacture, into useful objects for keeping a check on the entities to be supervised.

The receiver 60 (Figure 2) substantially presents the same characteristics as the receiver 10 but has one compartment 61 only for housing one transmitter 40.

Figure 3 illustrates another version of the device comprising a receiver 70 and transmitters 80-82 substantially similar to devices 10 and 60 described above, except that both the receiver and the transmitters are activated or de-activated automatically by physically switching the transmitters inside the receiver on or off.

For this function the receiver presents internal microswitches 72-74 at the position of the transmitter housing while, in the same positiion, the transmitters each present a microswitch 75.

When each transmitter is placed in its housing 71 in the receiver 70, the switch 75 is activated, this being de-activated and the switches 72-74 of the receiver activated, then de-activated when all the transmitters have been put in.

Takng a transmitter out of the receiver causes closure of the switch on the transmitter extracted, then activated and, simultaneously, closure of a switch on the receiver, then activated.

The activating and de-activating switches can be magnetic.

In the case of this version also, composition of a receiver made to take a single transmitter is obviously possible.

CLAIMS

1. Process and electronic device (10, 60, 70, 40-42, 80-82), miniaturized, pocket-sized, with independent electric feed, for teleconnection by means of electromagnetic waves between a receiver device (10, 60, 70) for the user and one or more transmitters (40-42, 80-82) to be assigned to persons, or associated to animals or objects, entities in general, placed under the user's protection and supervision, comprising electronic circuits (30-35, 50-52) by means of which, as soon as the distance between one of the transmitters (40-42, 80-82) and the receiver (10, 60, 70) exceeds a certain value, acoustic warnings are emitted in the receiver (10, 60, 70) to allow the user to take action for protection of the entity to which the transmitter (40-42, 80-82) has been connected and which has sounded the warning,

characterized in that the electronic circuit (30-35, 50-52) is voice dedicated so that the acoustic warning calls out a name or a word identifying the protected entity .

2. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 1,

characterized in that battery (15) consumption by the receiver (10, 60, 70) and (43) by the transmitters (40-42, 80-82) is reduced determining connection between the receiver (10, 60, 70) and transmitters (40-42, 80-82) by codified discontinuous transmission.

3. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 1,

characterized in that specially made devices and circuits (30-35, 50-52) permit and determine, when each transmitter (40-42, 80-82) is physically separated from the receiver (10, 60, 70), manual or automatic activation of the separated receiver and transmitter (40-42, 80-82) and determine when a transmitter (40-42, 80-82) is physically put back into the receiver (10, 60, 70), manual or

automatic de-activation of the transmitter and, when all the transmitters (40-42, 80-82) have been put back in, de-activation of the receiver (10, 60, 70).

4. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 3,

characterized in that the devices for automatic activation and de-activation are microswitches (46, 75) operated by physical insertion or removal of the transmitters (40-42, 80-82) in relation to the receiver (10, 60, 70).

5. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 4,

characterized in that the microswitches (46, 75) are magnetic.

6. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 1,

characterized in that the transmitters (40-42, 80-82) comprise a circuit (31, 51) which, due to the effect of a vocal sound, for example a crying child or a complaint made by some person, produces a warning signal in the receiver.

7. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 3,

characterized in that a special circuit compares the distance, from one moment to the next, between the transmitters (40-42, 80-82) and the receiver (10, 60, 70), with an electronic threshold of a value modifiable by the user adopting a special adjusting means (19) so determining, when said threshold has been exceeded, action by one or more devices corresponding to warning or operative functions.

8. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 7,

characterized in that a two-position manual selector (21) on the receiver (10, 60, 70) operates the alarm devices due to variations

in the distance, respectively greater or lesser, variations respectively useful when the protected entity moves beyond the safety distance, assisting discovery of an entity that has been lost, especially an object such as spectacles, an umbrella, wallet, mobile phone and the like.

9. Process and electronic device (10, 60, 70, 40-42, 80-82) as in claim 7,

characterized in that, if the electronic threshold has been exceeded, a means of control (22) on the receiver (10, 60, 70), can operate certain functions so that when, for example, the user together with a transmitter (40-42, 80-82) leaves a place where the receiver (10, 60, 70) has been installed, said functions can activate a car theft alarm, an alarm for premises in general, closure of a gate or a door, de-activate a system, such as lighting or heating, and reverse these operations when the user once more approaches said place.

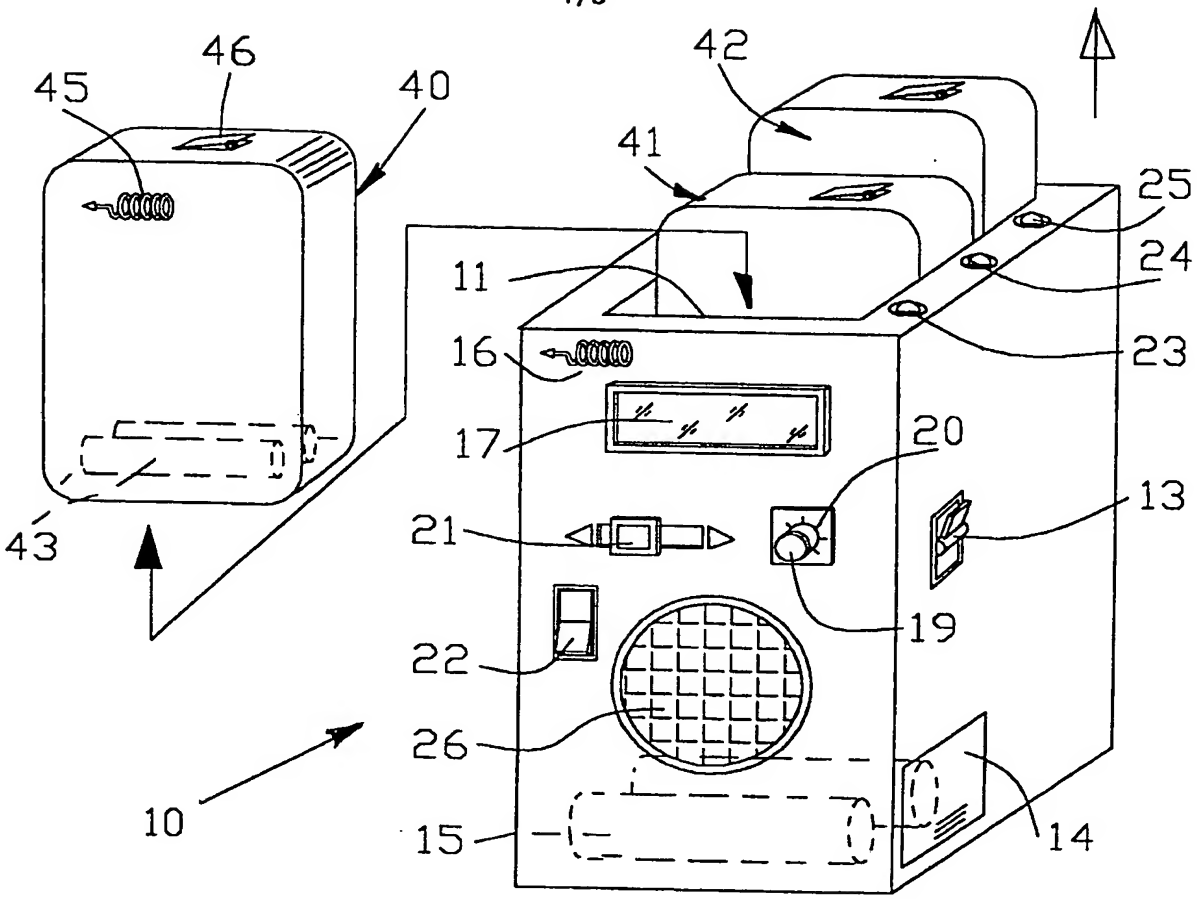

46
45
40
42
41
25
24
11
23
16
17
20
13
21
19
22
26
10
15
14
43

FIG.1

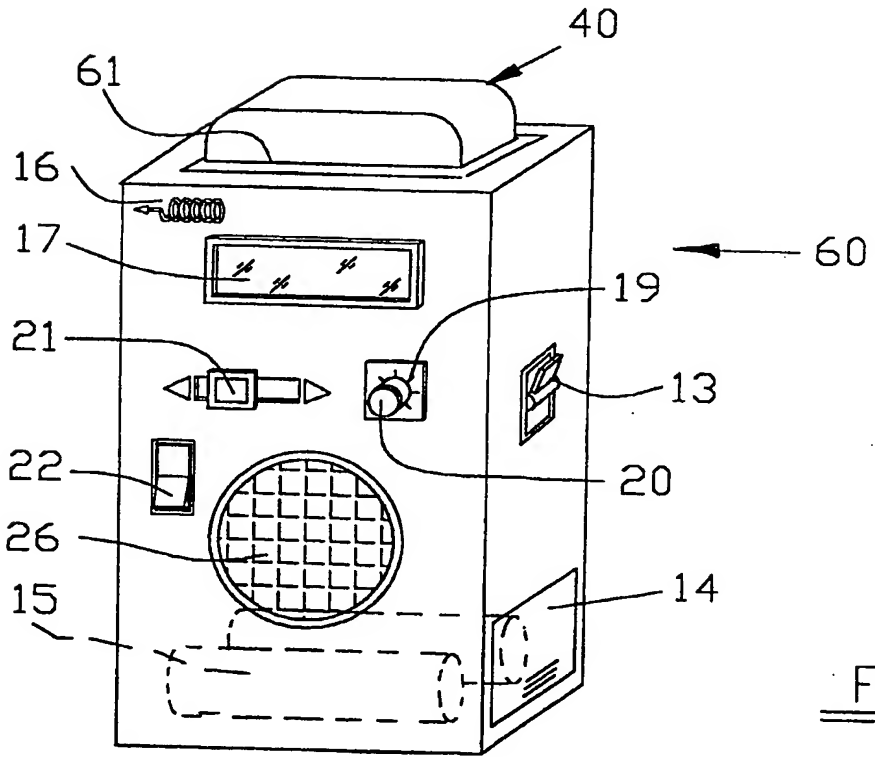

40
61
16
17
60
19
21
13
22
20
26
14
15

FIG.2

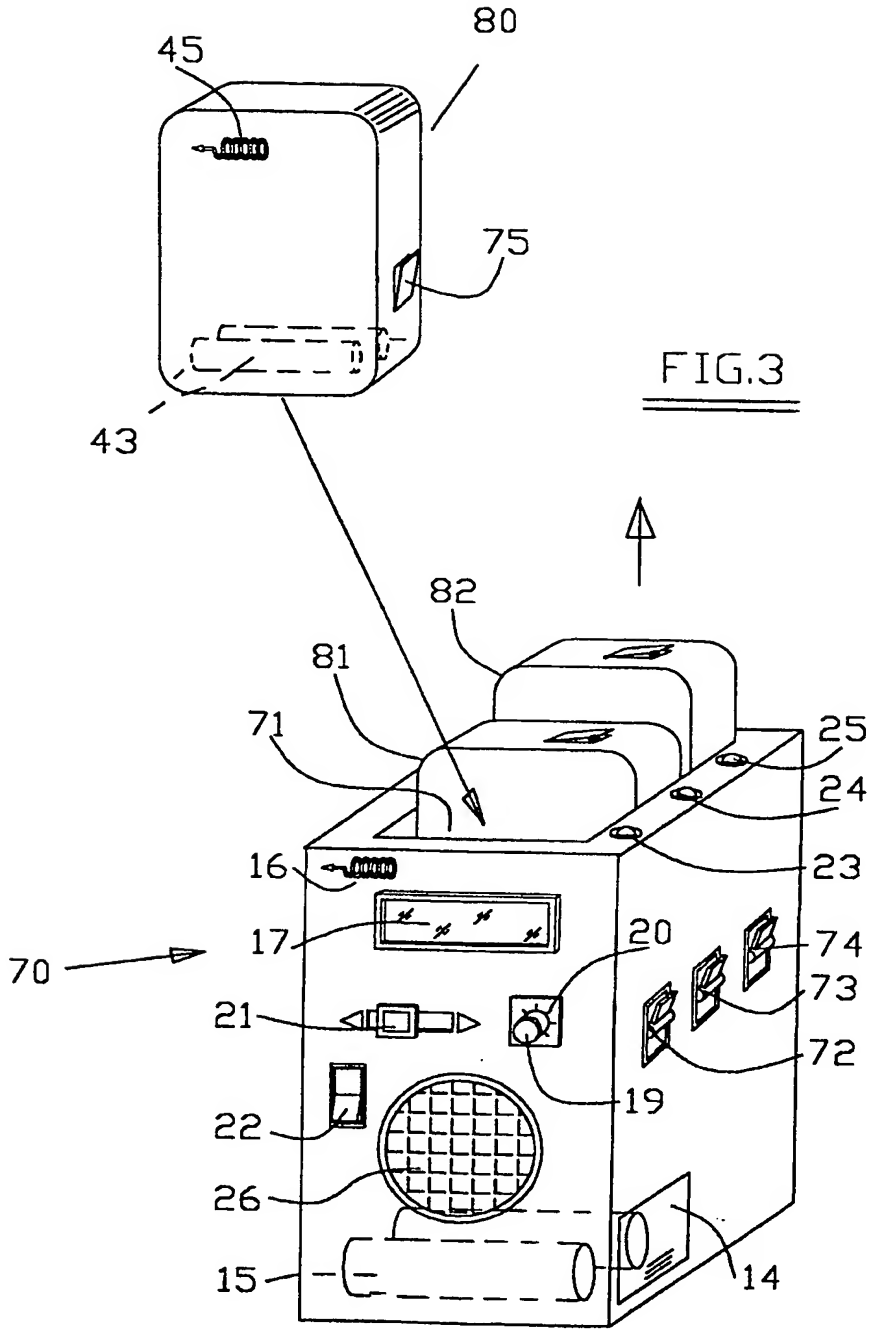


FIG.3

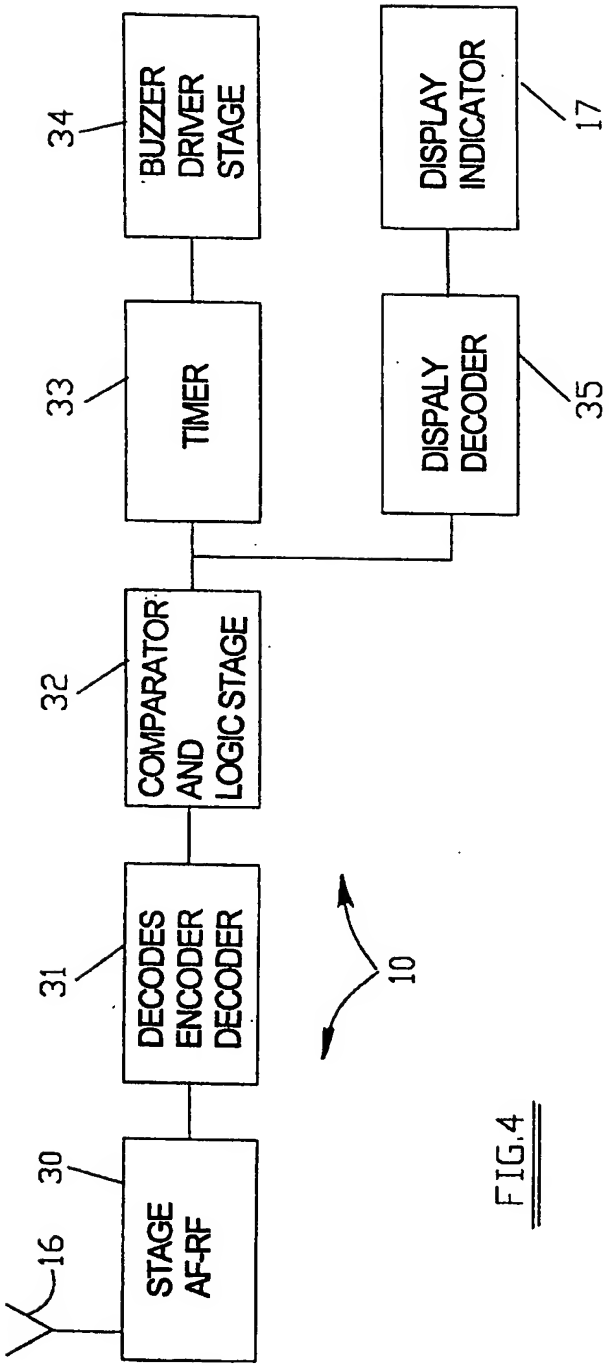

16
30
STAGE AF-RF
31
DECODES ENCODER DECODER
10
32
COMPARATOR AND LOGIC STAGE
33
TIMER
34
BUZZER DRIVER STAGE
35
DISPALY DECODER
17
DISPLAY INDICATOR

FIG.4

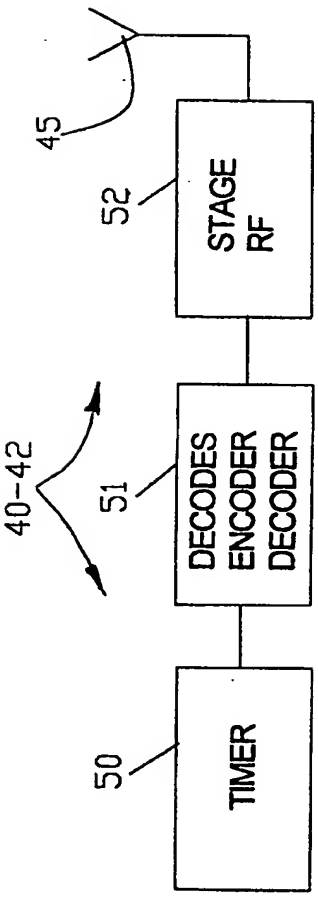

45
52
STAGE RF
40-42
51
DECODES ENCODER DECODER
50
TIMER

FIG.5

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 99/00280

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08B13/14 G08B21/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 402 104 A (LAROSA LAZARO) 28 March 1995 (1995-03-28) column 1, line 41 - line 43 column 2, line 11 - line 17 column 3, line 1 - line 7 claim 1 figures 2,4	1 2-7,9
Y A	WO 95 02874 A (BUONAVOGLIA GIROLAMO) 26 January 1995 (1995-01-26) page 2, line 18 -page 4, line 29 page 6, line 27 -page 7, line 1 page 7, line 14 - line 27	3-7,9 8

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 January 2000	31/01/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	De la Cruz Valera, D

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter[illegible]nal Application No
PCT/IT 99/00280

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 490 286 A (KAH JR CARL L C) 6 February 1996 (1996-02-06) column 1, line 29 - line 42	2

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No
PCT/IT 99/00280

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5402104 A	28-03-1995	NONE	
WO 9502874 A	26-01-1995	IT MI931559 A	16-01-1995
		IT 1271204 B	27-05-1997
		AT 150886 T	15-04-1997
		AU 7274094 A	13-02-1995
		BR 9407196 A	17-09-1996
		CA 2166961 A	26-01-1995
		DE 69402320 D	30-04-1997
		EP 0708952 A	01-05-1996
		JP 9500226 T	07-01-1997
US 5490286 A	06-02-1996	US 5245314 A	14-09-1993
		US 5357254 A	18-10-1994